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Department of  
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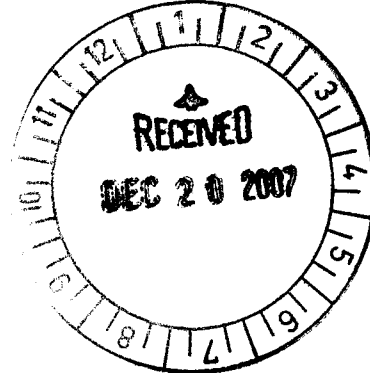
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File Code: 2580-3

Date: December 17, 2007

Richard Hargis, Jr.  
NEPA Document Manager, Office of Major  
Demonstration Projects  
National Energy Technology Laboratory, US  
Department of Energy  
PO Box 10940  
Pittsburgh, PA 15236-0940



Dear Mr. Hargis:

Please find below our review of the combined federal/state Draft Environmental Impact Statement (DEIS) for Excelsior Energy, Inc.'s (Excelsior), Mesabi Energy Project. The project is an integrated coal gasification combined cycle (IGCC) electric power generating station. The facility is proposed to be built in two phases; each phase would nominally generate 600 megawatts of electricity. The preferred location for the facility would place it near the town of Taconite in northeastern Minnesota. At this location, the facility would be 98 kilometers from the Boundary Waters Canoe Area Wilderness (BWCAW) and 188 kilometers from Rainbow Lake Wilderness (RLW). An alternative location near Hoyt Lakes would place the facility considerably closer to the BWCAW, only about 40 kilometers away.

In regards to the Department of Energy, the Proposed Action is to provide \$36 million in co-funding to the project under the Clean Coal Power Initiative (CCPI) Program. The DEIS states that \$22 million has already been made available to Excelsior. The goal of the CCPI program, as established by Congress, is to accelerate the commercial development of advanced coal-based technologies that can generate clean, reliable, and affordable electricity.

On the state side of the DEIS, the Proposed Action for the State of Minnesota is to approve, through the Public Utilities Commission (PUC), as supported by the Department of Commerce, the pre-construction joint permit application for the project. The mission of the PUC is to create and maintain a regulatory environment that ensures safe, reliable, and efficient utility services at fair and reasonable rates through, among other things, emphasizing energy resources that minimize damage to the environment.

As a Federal Land Manager (FLM), the Forest Service has an affirmative responsibility to protect the air quality related values of the Class I wilderness areas it administers, as specified in the Federal Clean Air Act. We also have the specific role on this project as a cooperating agency in providing technical expertise in the review of air quality impacts.

We have reviewed the sections of the DEIS relating to the air quality impacts from this project on the Forest Service Class I areas. As you know, an air emissions permit is also necessary for this project. It is through this process that our concerns are normally addressed, in cooperation



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with the permitting agencies - the Minnesota Pollution Control Agency (MPCA), the Environmental Protection Agency (EPA), and other FLMs such as the National Park Service. The air permit process for this project is ongoing. While we are sure we will continue to work with our state and federal partners through the air permit process, we felt it necessary to submit comments on the DEIS due to our role as a cooperating agency and the need to clarify some information.

Our biggest concerns with this project are twofold. The first is that Excelsior is not proposing to include emission controls that can significantly reduce its emissions and that have been specified on other IGCC projects in the United States. The second is the modeled impacts to visibility in the BWCAW. We view the visibility impacts predicted from this project at either site as significant. We do not agree that the modeled impacts can be ignored due to weather conditions or other reasons. This is not in agreement with current FLM guidance. In our past experience, proponents of projects showing impacts at similar levels have worked with the MPCA to develop mitigation plans in an attempt to offset their impact. It has also been our past practice to not entertain mitigation proposals until the facility in question has reduced its emissions to the level of Best Available Control Technology (BACT). The FLMs do not agree that the emission rates in the current DEIS and air permit application represent BACT. It is clear from their letter of October 19, 2007, to Excelsior that the MPCA is of the same opinion on this issue. In past communications with Excelsior, we have strongly suggested that they consider reducing their emissions as a way to eliminate the modeled impacts and with this letter continue to do so.

Our technical comments are enclosed. If you have specific questions on these comments, please contact Trent Wickman of my staff at (218) 626-4372. We look forward to working with you in addressing the impacts from this project on our Wilderness areas.

Sincerely,



JAMES W. SANDERS  
Forest Supervisor

Enclosures (2)

cc: William Storm  
Marshall Cole  
Chris Nelson  
Don Shepherd  
Kenneth Westlake  
Jennifer Darrow,  
Bob Evans



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Vice President, Environmental Affairs  
Excelsior Energy  
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Minnetonka, MN 55305

RE: Best Available Control Technology Analysis for Combustion Turbine Sulfur Dioxide and Nitrogen Oxide Emissions

Dear Mr. Evans:

This letter responds to your June 11, 2007 letter regarding Best Available Control Technology (BACT) for the combustion turbines at Mesaba I and II. This letter is divided into two parts; the first part addresses the Sulfur Dioxide (SO<sub>2</sub>) BACT determination and the second part addresses the Nitrogen Oxide (NO<sub>x</sub>) BACT determination.

#### **I. Sulfur Dioxide BACT Determination**

Minnesota Pollution Control Agency (MPCA) staff reviewed information submitted by Excelsior Energy and determined Selexol is a cost-effective technology for SO<sub>2</sub> control for the proposed Mesaba I and II Integrated Gasification Combined Cycle (IGCC) power plant. This determination is based on the following information.

- a. Your June 11, 2007 letter (Exhibit I pages 1 - 3) compares the cost per ton of SO<sub>2</sub> removed for the proposed Mesaba I and II IGCC power plant, with the cost per ton of SO<sub>2</sub> removed for Pulverized Coal-fired (PC) boilers. This comparison of costs between an IGCC and a PC boiler plant is inappropriate because IGCC and PC boilers are two different technologies for coal-fueled electric power production. Comparing the cost of controls for a pollutant between these two technologies does not follow the procedure for determining BACT according to U.S. Environmental Protection Agency's (EPA) October 1990 New Source Review (NSR) Workshop Manual. ("NSR workshop manual" or "NSR manual").

Page B.13 of the NSR workshop manual states that EPA has generally not considered the BACT requirement as a means of changing the design of the emissions unit when considering control alternatives. For example, the MPCA would not normally consider a natural gas combined cycle turbine as a control alternative to the IGCC proposed by Excelsior, although the NSR workshop manual indicates that we have the discretion to do so. Nevertheless, the MPCA would certainly not consider a PC boiler as a BACT control alternative to the IGCC and the SO<sub>2</sub> control costs for a PC boiler are irrelevant in the evaluation of the control costs for the proposed IGCC power plant.

- b. Excelsior's cost effectiveness determination for Selexol cleaning of the syngas Hydrogen Sulfide (H<sub>2</sub>S) content to 20 ppmv results in an average cost of \$7,663 per ton of SO<sub>2</sub> removed. This cost is well under the EPA cost-prohibitive threshold. Therefore, the MPCA determines that Selexol is a cost-effective control technology.

The MPCA therefore concludes Selexol is BACT for SO<sub>2</sub> at Mesaba Energy, and the BACT limit is approximately 0.010 lb/mmBtu (on a heat input to gasifier basis). This limit may be on a 30-day rolling average basis; however, short term limits may be necessary to protect the 1-hour, 3-hour, and 24-hour SO<sub>2</sub> ambient air quality standards.

## II. Nitrogen Oxides BACT Determination

### a. Technical Feasibility

MPCA staff do not agree with Excelsior Energy's determination that Selective Catalytic Reduction (SCR) is a technically infeasible control option for coal-based IGCC. Staff reviewed information submitted by Excelsior Energy as well as guidance in the NSR workshop manual and determined SCR is technically feasible for combustion turbine NO<sub>x</sub> control for the proposed Mesaba I and II IGCC power plant. This determination is based on the following information.

- i. Excelsior's June 11, 2007 Exhibit I (page 5) discussion titled "*The NSR manual supports classification of SCR as technically infeasible for coal-based IGCC*" states in part "*According to the NSR manual, the first of three standards under which a control technology must be considered technically feasible is due to a previous demonstration of its successful use on the type of source under review*". This statement is incorrect.

The NSR workshop manual (page B.17) states "*If the control technology has been installed and operated successfully on the type of source under review, it is demonstrated and it is technically feasible. For control technologies that are not demonstrated in the sense indicated above, the analysis is somewhat more involved.*"

*Two key concepts are important in determining whether an undemonstrated technology is feasible: "availability" and "applicability" ...a technology is considered "available" if it can be obtained by the applicant through commercial channels or is otherwise available within the common sense meaning of the term. An available technology is "applicable" if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible."*

It is clear the manual does not require a successful installation and operation of a control technology for the technology to be technically feasible. Although a successful application of the control technology to the source type under review would readily demonstrate the technology is technically feasible, it is not required to determine that a technology is feasible.

- ii. Exhibit I (page 6) discussion titled “*Technical feasibility of undemonstrated controls due to their availability and applicability*” misinterprets the context of the term *availability* as used in the NSR workshop manual technical feasibility analysis discussion. The NSR workshop manual (pages B.17 - B.18) discussion of availability is in the context of the control equipment technology (i.e. SCR) only, and not of the control equipment availability to the specific source type. SCR has been widely available for several decades, and therefore is considered an available control technology for this project.
- iii. The NSR workshop manual (page B.18) states “*Technical judgment on the part of the applicant and the review authority is to be exercised in determining whether a control alternative is applicable to the source type under consideration. In general, a commercially available control option will be presumed applicable if it has been or is soon to be deployed (e.g., is specified in a permit) on the same or a similar source type.*” SCR has been specified in coal-based IGCC permits (most recently in June 2007 for the Christian County Generation in Taylorville, Illinois, Illinois EPA Permit No. 05040027), and is used for NO<sub>x</sub> control on many PC boilers.
- iv. Absent a permit, technical feasibility can also be determined through examination of the physical and chemical characteristics of the pollutant-bearing gas stream and comparison to the gas stream characteristics of the source types to which the technology had been applied previously. Although syngas has a higher H<sub>2</sub>S content than natural gas combusted in SCR-controlled natural gas combined cycle power plants, SCR has been employed for the past decade on pulverized coal boilers. Similar concerns about the SCR application to coal-fired boilers also existed, but have been successfully resolved. A Heat Recovery Steam Generator (HRSG) is similar enough to a boiler that lessons learned from the application of SCR to pulverized coal-fired boilers can be applied to SCR for coal-based IGCC. The MPCA sees no evidence of why the SCR issues for coal-based IGCC can not be resolved. The need for physical modifications to the HRSG to make it compatible with coal-based IGCC do not make SCR technically infeasible. However, any additional costs for such modifications should be included in the economic impacts portion of the BACT analysis. The MPCA considers SCR to be applicable and available and, therefore, a technically feasible control technology for coal-based IGCC.

**b. Economic Feasibility**

The NSR workshop manual top-down BACT analysis method directs the reader to perform an economic feasibility determination for all controls that are technically feasible. Excelsior Energy needs to conduct the cost analysis for SCR control of NO<sub>x</sub> emissions and submit it to the MPCA to complete the BACT process for NO<sub>x</sub> control for the

combustion turbines. Submittal of a cost effectiveness matrix using variables such as an improved ammonia injection grid for reduced ammonia slip, and maintaining HRSG temperature at various levels above the ammonium bisulfate dew point would be appropriate. Excelsior may also consider contacting other entities that have applied for or obtained permits for coal-based IGCC with SCR, to inquire about SCR costs.

Finally, the NSR workshop manual (page B.74) states *"While it is not the intention of BACT to prevent construction, it is possible that local or regional air quality management concerns regarding the need to minimize the air quality impacts of new sources would lead the permitting authority to require a source to either achieve stringent emission control levels or, at a minimum, that control cost expenditures meet certain cost levels without consideration of the resultant economic impact to the source."* SO<sub>2</sub> and NO<sub>x</sub> are visibility impairing pollutants and due to the proposed location of Mesaba II and II, it could be determined that higher BACT control costs for these pollutants are warranted.

In closing, MPCA staff have determined that Selexol is a cost effective method for SO<sub>2</sub> emissions control for coal-based IGCC, and SCR is a technically feasible control option for coal-based IGCC, and a BACT limit can be set. To complete the NO<sub>x</sub> emissions BACT analysis, please submit a cost analysis for SCR control of combustion turbine NO<sub>x</sub> emissions at your earliest convenience. If you have any questions, please contact Marshall Cole at 507-280-2992 or at [marshall.cole@pca.state.mn.us](mailto:marshall.cole@pca.state.mn.us).

Sincerely,

Jeff J. Smith, Manager  
Air Quality Permit Section  
Industrial Division

JJS/MC:lao

cc: Trent Wickman, NPS  
Don Shephard, NPS  
J. David Thornton, MPCA  
Bob Beresford, MPCA, Duluth  
Rich Sandberg, MPCA  
Don Smith, MPCA  
Steve Pak, MPCA  
Anne Jackson, MPCA  
Marshall Cole, MPCA, Rochester  
AQ File No. 4274



## **Technical Comments on the Class I Air Quality Material in the Mesaba Energy DEIS**

Page 3.3-11: We do not view the purchase of acid rain allowances by affected units in amounts required by the Acid Rain program as mitigation. These purchases are already required by the Clean Air Act to satisfy the goals of the Acid Rain Program.

Page 4.3-14: While a number of other approaches are presented, Method 2 is the currently applicable method for visibility analyses per the FLM interagency guidance document for conducting air quality related value analyses, *Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report (December 2000)*. Although characterized as "small" in the DEIS, we see 31 days in three years over a 10% change in visibility as an impact that, if included in the final permit and EIS for this facility without other mitigation, would likely be declared adverse.

Page 5.2-3: We do not understand the basis for the emission rates used for the facilities in the table. While they may be appropriate for an increment analysis, having no emissions of sulfur dioxide and/or nitrogen oxides from utilities and taconite plants does not fit the intent of a visibility analysis. Since the emission inventory is the basis for the cumulative analysis, it is hard to draw any conclusions from it - especially with regard to visibility. The assessment of cumulative visibility impacts are probably best dealt with through the regional haze program and plan being developed by the State of Minnesota.

In regards to increment, Minnesota Steel conducted a PM<sub>10</sub>, -24-hour Class I cumulative increment analysis for their recent air permit application and determined the cumulative increase to be 7.0 ug/m<sup>3</sup>. The identical analysis for this project showed an increase of about 2.1 ug/m<sup>3</sup>. It is important that this sizeable difference be explained.

Page 5.3-16: The MPCA, in consultation with the EPA, will determine BACT for the facility. Although Excelsior may maintain that the current design of its facility represents BACT, the agency with the authority to decide this issue currently does not (see the attached letter from the MPCA dated October 19, 2007). In this letter the MPCA concludes that Selexol is BACT for sulfur dioxide (see top of page 2). The agency also concludes that selective catalytic reduction (SCR) is technically feasible for nitrogen oxides and requests more information to make its determination of economic feasibility and thereby also its final BACT determination. As such we recommend that DOE modify the discussion in the DEIS to more accurately reflect what the deciding agency has determined for BACT.

Lastly we are very interested in seeing a model run which shows the visibility impacts of the facility after the installation of Selexol and SCR.

